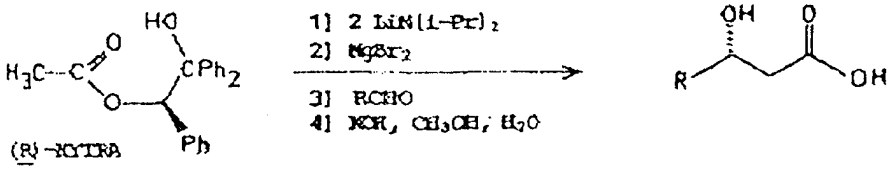
09/415,966

233. Stereoselective Aldol Reactions with (R)- and (S)-2-Hydroxy-1,2,2-triphenylethyl Acetate ["HYTRA"]

M. Braun, R. Devant, U. Mahler, Institute of Org. Chemistry, Univ. of Düsseldorf, FRG

(R)- and (S)-2-Hydroxy-1,2,2-triphenylethyl acetate ("HYTRA") has proven himself to be a reliable reagent for the stereoselective introduction of a chiral acetate moiety into achiral as well as chiral aldehydes. HYTRA is readily available from (R)- or (S)-mandelic acid.



Amongst the target molecules, prepared as pure enantiomers by this method, are the compactin lactone and compactin itself, 2-deoxy ribonolactone as well as the antiepileptic amino acid GABOB.

WEDNESDAY MORNING - SECTION D - NUCLEIC ACID CHEMISTRY - K. D. Stewart, Presiding

234. NEW BASE PAIRS FOR DNA AND RNA. Tilman Krueger, Ulrike von Krosigk, Lawrence J. MacPherson, Simon E. Moroney, Joseph A. Piccirilli, Joseph B. Sweeney, Christopher Y. Switzer, and Steven A. Benner, Laboratory for Organic Chemistry, E.T.H., CH-8092 Zurich, Switzerland

Natural nucleosides use only 2 of 4 possible hydrogen bonding patterns to create a complementary code for replication and secondary structure. U presents an acceptor-donor-acceptor pattern to a complementary purine; C presents a donor-acceptor-acceptor pattern. These are the only schemes possible for a base attached to ribose via a C-N bond. However, other base pairing schemes can be made with C-glycosides. Nucleotide bases with these new hydrogen bonding schemes, incorporated enzymatically into DNA and RNA opposite complementary purine analogs, can probe structure in nucleic acids, inhibit enzymes acting on nucleic acids, and allow rational construction of RNA molecules capable of catalyzing the RNA-directed polymerization of RNA. Such RNA molecules are a simple form of life. We report the synthesis of several such nucleosides and their corresponding triphosphates, and their incorporation into oligonucleotides.

235. RECOGNITION OF G,C BASE PAIRS IN THE MINOR GROOVE OF DNA. Warren S. Wade, Peter B. Dervan, Department of Chemistry, California Institute of Technology, Pasadena, California 91125

We have synthesized a series of analogs of the natural product distamycin A by replacing the N-terminal pyrrolecarboxamide with furan 2 and 3-carboxamide, thiophene 2 and 3-carboxamide, pyridine 2, 3, and 4-carboxamide, and N-methyl-imidazole-2-carboxamide. Most analogs bind to the A,T rich sites recognized by the parent compound, but two compounds, pyridine-2-carboxamide-netropsin (2-PyN) and N-methylimidazole-2-carboxamide-netropsin (2-ImN), prefer a common binding site not recognized by distamycin A. A combination of high resolution sequencing gels and double-stranded cleavage of intact linear pBR322 reveals the consensus sequence to be 5'-WGWCW-3' (W = A or T), with the molecule located in the minor groove in either of the equivalent orientations. For strongest binding, an additional A,T basepair is required adjacent to the binding site. We propose a model where the primary recognition element is the distance between the G-N2 hydrogens, and the major interaction is a three-center hydrogen bond between the small molecule ring nitrogen, the amide carbonyl, and the N2 hydrogen of G.

236. BIOORGANIC CHEMISTRY OF POLYAMINE/DNA INTERACTIONS

Kent D. Stewart, Department of Chemistry, Emory University, Atlanta, Georgia 30322

Polyamines, $RHNCH_2CH_2CH_2CH_2NHR'$, (putrescine, R,R'=H; spermidine, R=H,R'=$CH_2CH_2CH_2NH_2$; spermine, R,R'=$CH_2CH_2CH_2NH_2$) are well known to play important roles in several metabolic processes, including binding to DNA. Using a fluorescence detected ethidium displacement assay, the DNA-binding properties of 18 di-, tri-, and tetracationic amines with natural and synthetic polynucleotides have been determined. The structural aspects of

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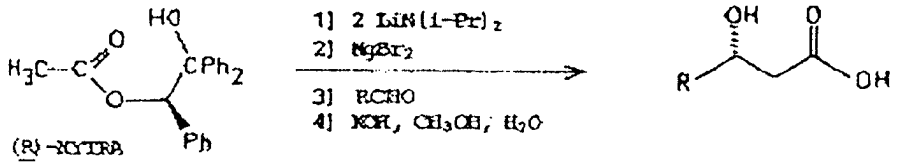

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